Long Questions

1. Find the real root of the equation by bisection method (perform five iterations)
   (a) $x^3 - x - 1 = 0$
   (b) $3x - \sqrt{1 + \sin x} = 0$
   (c) $x \log_{10} x = 1.2$
2. Find the real root of the equation by bisection method correct up to three decimal places
   (a) $\cos x - xe^x = 0$
   (b) $x^3 - 4x - 9 = 0$
   (c) $x^4 - x - 10 = 0$
3. Find the real root of the equation by secant method (perform three iterations)
   (a) $x^3 - 9x - 1 = 0$
   (b) $xe^x - 3 = 0$
   (c) $x^2 - \log_e x - 12 = 0$
4. Find the real root of the equation by secant method correct up to three decimal places
   (a) $x^4 - x - 10 = 0$
   (b) $x^3 - x^2 - 2 = 0$
   (c) $x - e^{-x} = 0$
5. Find the cube root of 2 by using Newton Raphson method correct upto three decimal places.
6. Find the real root of the equation by Newton Raphson method (perform four iterations)
   (a) $x^3 - 5x + 1 = 0$
   (b) $x - e^{-x} = 0$
   (c) $3x = \cos x + 1$
7. Find the real root of the equation vy Newton Raphson method correct upto three decimal places.
   (a) $3x - \cos x - 1 = 0$
   (b) $x \log_{10} x - 1.2 = 0$
   (c) $\log_e x - \cos x = 0$

8. Find the real root of the equation by fixed point iteration (perform four iterations)

   (a) $x^3 - x^2 - 1 = 0$

   (b) $\cos x - xe^x = 0$

   (c) $x = 0.21 \sin(0.5 + x)$

9. Find the real root of the equation by fixed point iteration method correct up to three decimal places

   (a) $e^x - x = 0$

   (b) $x^3 + x^2 = 100$

   (c) $5x^3 - 20x + 3 = 0$

10. Solve by using Gauss seidal iteration method (perform five steps)

    (a) $27x + 6y - z = 85$
    $6x + 15y + 2z = 72$
    $x + y + 54z = 110$

    (b) $7x + 52y + 13z = 104$
    $83x + 11y - 4z = 95$
    $3x + 8y + 29z = 71$

11. Apply Gauss seidal iteration method to solve the following system of equations correct upto three deimal places.

    (a) $x + 2y + 5z = 20$
    $5x + 2y + 2z = 12$
    $x + 4y + 2z = 15$

    (b) $3x + 20y - z = -18$
    $2x - 3y + 20z = 25$
    $20x + y - 2z = 17$

12. Solve by using successive over relaxation (SOR) method with relaxation parameter $\omega = 1.25$.

    (a) $2x + z = 6$
    $2y + z = 3$
    $y + 2z = 4.5$

    (b) $4x + 3y = 2y$
    $3x + 4y - z = 30$
    $-y + 4z = -24$

13. Solve by using crouts method

    (a) $x + y + z = 1$
    $3x + y - 3z = 5$
    $x - 2y - 5z = 10$

    (b) $5x + 2y + z = -12$
    $-x + 4y + 2z = 20$
    $2x - 3y + 10z = 3$

14. Solve by using dolittle method

(a) $2x - 6y + 8z = 24$
$5x + 4y - 3z = 2$
$3x + y + 2z = 16$

(b) $x + 2y + 3z = 6$
$2x + 3y + z = 9$
$3x + y + 2z = 8$

15. Solve by using cholesky's method

(a) $2x + y + 3z = 1$
$x + 4y - z = 3$
$3x - y + z = 4$

(b) $4x + 3y - z = 3$
$3x + y + 5z = 2$
$-x + 5y + 2z = 5$

16. From the following data find y at $x = 43$ and $x = 84$ by using Newtons forward and backward interpolation formula

x :	40	50	60	70	80	90
y :	184	204	226	250	276	304

17. From the following data

Temp (°C)	:	140	150	160	170	180
Pressure Kgf/cm^2	:	3685	4854	6302	8076	10225

using Newtons interpolation formula find the pressure of the stream for a temperature of 142°C.

18. From the following data given I, the indicated HP and V the speed in knots developed by a ship

V :	8	10	12	14	16
I :	1000	1500	3250	5400	8950

find I when V=9 using Newtons interpolation formula.

19. Estimate the value of y at $x = 28$ from the following data by using Newtons backward interpolation formula.

x :	20	23	26	29
y :	0.3420	0.3907	0.4384	0.4848

20. Estimate the value of y at $x = 42$ from the following data by using Newtons backward interpolation formula.

x :	20	25	30	35	40	45
y :	354	332	291	260	231	204

21. By means of Newtons divided difference formula find the value of $f(15)$ from the following table

x :	4	5	7	10	11	13
$f(x)$:	48	100	294	900	1210	2028

22. Use Newtons divided difference formula to find $f(x)$ from the following table

x :	0	1	2	4	5	6
$f(x)$:	1	14	15	5	6	19

23. Find $f'(10)$ from the following table by using Newtons divided difference interpolation formula

x :	3	5	11	27	34
$f(x)$:	-13	23	899	17315	35606

24. Using Lagranges interpolation formula calculate $f(3)$ from the following table

x :	0	1	2	4	5	6
$f(x)$:	1	14	15	5	6	9

25. Using Lagranges interpolation formula find $f(x)$ at $x = 2.5$ from the following table

x :	1	2	3	4
$f(x)$:	1	8	27	64

26. Find the cubic Lagranges interpolating polynomial from the following table

x :	0	1	2	5
$f(x)$:	2	3	12	147